



Effects of Exchange Rate and World Prices on Export Price of Vietnamese Coffee

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ABSTRACT

Identifying factors of export price fluctuation in agricultural products is necessary to equip decision makers and producers with bases and tools in forecasting price fluctuation and then suggesting solutions for risk mitigation. This research integrated quantitative and qualitative methods to analyze and measure effects of some major factors on export price of Vietnamese coffee. The data of 34 years from 1981 to 2014 shows that coffee price have fluctuated with a cycle of 5-year increase and 7-year decrease. The study found major factors of the price fluctuation are exchange rate and export prices of other exporting countries like Brazil and Colombia. Export price of Brazilian coffee made a positive effect on the price of Vietnamese suggesting a competition between two countries in the world coffee market while Colombian coffee occupied its own market share. To promote sustainable growth in exports, Vietnamese coffee needs to maintain stable markets and invest more on branding and product quality to improve its competition capacity.

Keywords: Price, Coffee, Export, Vietnam, Fluctuation

JEL Classifications: F140, L110, M210

1. INTRODUCTION

Vietnam is one of countries that export a lot of agricultural products to the world. The role of agricultural products is increasing significantly in Vietnam when many large investors concern and invest into agricultural market. Through agricultural exports, Vietnam integrates with others countries in the global economy. Export value of Vietnamese agricultural products reached 22 billion dollars in 2015 with three important commodities are fisheries, coffee and rice (GSO, 2016). This export value brings a significant amount of foreign currency for the country, but it depends on the fluctuations of prices in the world' market, especially during international integration. As the result, despite farmers contribute to income of the country significantly, their life is not guaranteed and unstable due to violation of prices. Moreover, increasing of prices leads to decrease food security expenses. Fluctuation in prices of agricultural products is more than the ones in prices of most non-agricultural products (Tomex and Robinson, 2003). Export commodity prices of one country can be affected by the one of many other countries (Carter and MacLaren, 1997). Therefore the impact of the price review from some countries on the export price of Vietnamese coffee is needed.

2. THEORETICAL FRAMEWORK

Price is the basic mechanism for market performance (Goodwin and Holt, 1999). For export price, a theoretical equation is expressed as following:

$$P = \frac{P_D}{E}$$

Where,

P: Export price of a commodity in US Dollar

P_D : Domestic price of the commodity in local currency (for example: VND)

E: Exchange rate of the local currency against USD.

In the world market, price is established through the adjustment process of world demand and export supply and affected by demand and supply shifters in export and import countries (Thompson, 2000). The market price in the world market would also adjust supply and demand, enforce producers or exporters actively reduce or increase their production quantity to supply toward the market (Begg et al, 2005).

In a market, demand of a commodity (Qd) depends on its own price (P_x), consumers' income (I_c), buyers' preferences (T_c), competitive products' price (P_r), population (P_o), buying capacity (S_m), or consumers' expectation on its price (F_c); expressed by the following equation

$$Q_d = f(P) = a + bP_x + cI_c + dT_c + eP_r + fS_m + gF_c \quad (1)$$

Whilst, a commodity's export supply (Qs) depends on its own price (P_x), exchange rate (E_x), production cost (oil price, Poil, for instance), governmental policy (GP), profitability of substitute products and other external factors.

Among the above factors, price of inputs and substitute products as well as exchange rate are very important one affecting directly on export price of a commodity in the world market (Thompson, 2001), and the export supply is expressed as follow:

$$Q_s = f(P) = a + bP_x + cE_x + dPoil + eGP \quad (2)$$

For agricultural products, exporters and importers behave in a competitive world market (Tomek and Robinson, 2003). Therefore, world demand and export supply are equal:

$$Q_d = Q_s \quad (3)$$

With Equations 1-3, a price model can be established as following

$$P_x = a + bI_c + cT_c + dS_m + eF_c + f_j \sum_{j=1}^n P_j + gE_x + hP_{oil} + iGP \quad (4)$$

With the above equation, price of a exported product of a country is a function of price of other products may competing in the world market, exchange rate and other factors like income, technology, production cost,...

3. METHODOLOGY

Qualitative and quantitative methods were utilized integrated in this research. For qualitative method, in-depth interviews with structure and semi-structure questionnaires helped to find out some qualitative and quantitative variables affecting on Vietnamese export price.

With time series data collected from UN-Comtrade, IMF, Vietnam Custom, Ministry of Agriculture and Rural Development, FAO, ICO, besides descriptive statistics, this research applied linear regression methods in quantitative methods. In order to measure magnitude of the found variables affecting on export price of Vietnamese coffee, popular and modern regression tools as OLS, unit root test, causality test, cointegrated test were used to build a double logarithm model described as following:

$$\ln P_x = \hat{\beta}_0 + \hat{\beta}_1 \ln EX_t + \hat{\beta}_2 \ln P_{oi} + \hat{\beta}_3 \ln P_{ci} + \hat{\beta}_4 \ln P_{ti} + f_j \sum_{j=1}^n \ln P_j + \hat{\beta}_5 Q_{1t} + \hat{\beta}_6 Q_{2t} + \hat{\beta}_7 Q_{3t} + e_t$$

While,

P_x: Vietnamese coffee price

E_x: Exchange rate of Vietnam dong relative to US dollar

P_o: The world average price of energy

P_c: The world average price of cocoa

P_r: The world average price of tea

P_j: Export price of Colombian and Brazilian coffee

Q_i: Yearly quarter (I = 1,2,3 represented for the first three quarters of a year)

e: Error term of the regression model.

4. RESULTS AND DISCUSSION

4.1. Fluctuation in Coffee Prices of the World and Vietnam

During 1981 - 2014, coffee price in the world market had strongly fluctuated and become less predictable (Andrew and James, 2002). The world price was in increasing trend from 1980 and got its peak in 1986 (Figure 1) and followed the export price of some major coffee exporting countries as Vietnam, Brazil, India and Colombia.

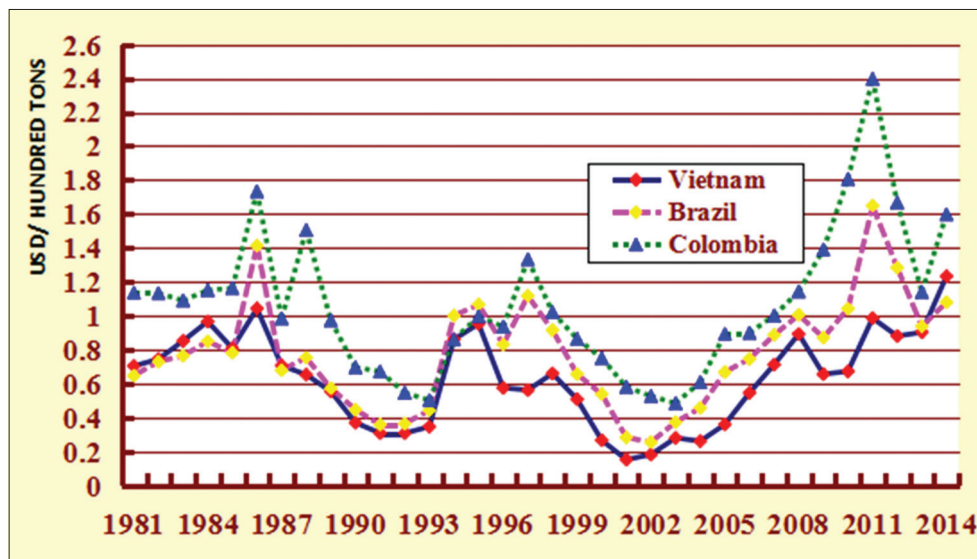
In 1986, export coffee price of the above countries got the peaks respectively of 104.23 USD/ton in Vietnam, 141.21 USD/ton in Brazil, 173.24 USD/ton in Colombia and 107.42 USD/ton in India. But after achieving the peaks, the export prices were continuously downing following the collapse of International Coffee Association in 1989 (Craves, 2006). Coffee prices in the world market were stable in the duration 1990-1993 but fluctuate again since 1994 as described by International Coffee Organization. The export price of four countries Vietnam, Colombia, and Brazil in 1995 had increased double relative to 1993 (Lewin et al, 2004) before a sudden collapse since 1998. Export price in the world market lost 20% in 1999, 25% in 2000 and 29% in 2001 (FAO, 2002) due to an increase in production of the major exporters. The price got back its value since 2004 (Figure 1) and reached peaks in 2014 with respectively, 123.22 USD/ton in Vietnam, 107.895 USD/ton in Brazil, 140.14 USD/ton in India and 159.71 USD/ton in Columbia.

Most researchers and business managers in coffee sector agreed that export prices in the world market follow the rule of supply and demand and a business cycle of seven years. After a 7-year stable increase, the world price of coffee seems to have a collapse (International Coffee Council, 2014). Although the price of Vietnamese coffee is the lowest in the world market, about 25% lower than the average value (Nhan, 2009), export price of the four major and important coffee producers and exporters, Vietnam, Brazil, Colombia and India, had co-integrated during 1981 to 2014 except a period of 1997-2004 when the price of Vietnam was likely to go far from the trend of the word coffee price. The fluctuation in world prices therefore affects Vietnamese coffee prices. In reverse, an out-break in coffee production in Vietnam also cause an influence on the world prices.

4.2. Measuring the Effects of Exchange rate and World Prices on Export Price of Vietnamese Coffee

With historical data from 1981-2014, tools and quantitative methods in time-series analysis were used to build up a regression

Figure 1: Export price in the world market of the major coffee exporting countries during 1981-2014



model to identify and measure possible effects of VND-USD exchange rate and prices of competitors in the world market on the export price of Vietnamese coffee.

Augmented Dickey-Fuller tests (Table 1) confirmed the stationary of variables included in the regression model. This confirmation permits to use ordinary least square method in econometric to regress a model in which export price of Vietnamese coffee is the dependent variable while exchange rates and prices of competitors, Columbia and Brazil, are interesting independent variables.

Pairwise granger causality test found that export prices of Colombia và Brazil coffee had strong effect on the one of Vietnamese coffee at significant level of 99% (P value respectively are 0.0068 and 0.0025). However, the test affirmed that the reverse effect is not significant statistically. Therefore, export prices of Colombia và Brazil coffee may use as pre-determinant variables for export price of Vietnamese coffee. Dummy variables represented to yearly quarters were also included in the model to test and isolate the seasonal effect on the price. The result for regressed model was described in Table 2.

Tests in econometrics were used to examine the appropriateness and to correct the regressed model. Although multicollinearity or heteroskedasticity were not found in the model, the variable of LnPtea (logarithm of world tea price) are likely to be irrelevant. Therefore, this variable was excluded out of the model. The value of Durbin - Watson criteria suggested a possible serial-correlation may exist in the model regressed. Procedures to correct the model had been implemented to give a more appropriate model. Insignificant variables were not reported to make the model simpler visually. The corrected model was written as following:

$$\text{LnPVN} = -0.83^{***} + 0.313^{***} \text{LnEX} + 0.50^{***} \text{LnBrazil} - 0.35^{***} \text{LnColom} - 0.038 \text{LnPcocoa} + 0.035 \text{LnPenergy} + 0.03^{***} \text{Q1} + 0.03^{***} \text{Q2} + 0.02^{***} \text{Q3} + \text{error} \quad (\text{Model 2})$$

n=79; R²=0.7414; $\bar{R}^2 = 0.7118$; D.W=1,67

Table 1: Stationary test results for variable used in the regression

Variable	P	Critical value (5%)	Lag length
LnPVN	0.78	-1.56	1
LnEX	0.839	-1.447625	1
LnPcocoa	0.58	-2.017204	1
LnPtea	0.68	-1.826889	1
LnPColom	0.26	-2.639025	1
LnBrazil	0.6911	-1.808842	1
LNPEnergy	0.9655	-0.746944	1

Table 2: Regression results for export price of Vietnamese coffee

Variable	Estimate coefficient	t-statistic	P
Constant	-0.790038	-1.560630	0.1231
LnEX	0.796636	9.001307	0.0000
LnBrazil	0.867564	8.170541	0.0000
LnColom	-0.681899	-5.738411	0.0000
LnTea	-0.075183	-1.939977	0.0564
LnCocoa	-0.149248	-2.745366	0.0077
LnEnergy	-0.041104	-1.3402	0.1845
Q1	0.004928	0.289274	0.7732
Q2	0.048637	2.672143	0.0094
Q3	0.059115	3.466379	0.0009

R²=0.9281, n=80, D.W=0.5782

4.3. Discussion

4.3.1. Effect of exchange rate on export price of Vietnamese coffee

The regression results confirmed that exchange rate and export prices of Brazil and Columbia coffee influenced the one of Vietnamese coffee. In the world market, exchange rate are usually used by exporting countries to support their exports. The regression result shows an unexpected effect of exchange rate on the export price of Vietnamese coffee with that when the Vietnam currency lost its value, export price in USD would increase. Most of Vietnamese exports uses USD for foreign payment because the Vietnam dong is pegged to the US dollar and thus ignores the value of other currencies. Once Vietnam dong lose its value, export price

in USD should be decrease theoretically. However, according to Keith (2014); Kristinek and Anderson (2002), if currencies of main competitors appreciated relative to the USD, Vietnamese export price still increase despite of its currency's devaluation or depreciation. In the duration 1981-2014, exchange rate of Colombia and Brazil decreased (aka its currencies appreciate) while Vietnam currency is continuously lose its value.

According to 92% experts interviewed, exchange rate affects positively export volume and price in long time. If exchange rate decreased, (aka Vietnam dong appreciated), foreign customers would deal to decrease export price (in USD). Therefore the regression result is confidential. An 1% increase in exchange rate would raise export price of Vietnamese coffee by 0.313% when other factors are constant.

4.3.2. Price effects of other main exporters on Vietnamese coffee

The regression results estimated that an 10% increase in export price of Brazilian coffee would raise the one of Vietnamese coffee by 5%. In contrast, an 10% increase in export price of Colombian coffee would lower the one of Vietnamese coffee by 3.5%.

The negative effect of Colombian price on Vietnamese price in the world market is due to difference in market share and kind of coffee produced. Colombia exports mostly Arabica coffee to the world market while Vietnam exports robust coffee like Brazil. This market segmentation would explain for the negative effect of Colombian price and positive effect of Brazilian one on Vietnamese price in the world coffee market.

The findings are agreed by most interviewed experts in coffee sector. Most Vietnamese coffee exporters concern price competition from Brazil, India, not from Colombia. They explained that Vietnamese coffee have to compete with Brazilian coffee in the same market share of low price robust while Colombia occupies the market share of high price Arabica coffee.

5. CONCLUSION

Export prices of major coffee have business cycle of 7 years. The world price of coffee seems to decrease after a 7-year stable increase. Export price of Vietnam, Brazil, Colombia and India, had co-integrated during 1981 to 2014 except a period of 1997-2004. The fluctuation in world prices affects Vietnamese coffee prices but not in reverse, confirmed by the Pairwise Granger Causal test.

The regression results estimated that an 1% increase in exchange rate would raise export price of Vietnamese coffee by 0.313%

when other factors are constant. A 10% increase in export price of Brazilian coffee would also be estimated to raise the one of Vietnamese coffee by 5%. In contrast, an 10% increase in export price of Colombian coffee would lower the one of Vietnamese coffee by 3.5%.

In order to promote the coffee sector in Vietnam, decision makers and coffee producers in Vietnam should monitor carefully not only the price fluctuation in the world coffee market but also the changes in exchange market.

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